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CPI

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B	Arbeitsverfahren; transportieren
C	Chemie; Hüttenwesen
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E	Bauwesen; Erdbohren; Bergbau
F	Maschinenbau; Beleuchtung; Heizung; Waffen; Sprengen
G	Physik
H	Elektrotechnik

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suche

Beschreibung [en]

The invention relates to a boiler circulating fluidized bed with a duct which extends along a longitudinal direction and which channels a stream of particles and gases containing nitrogen oxides, and a means to inject into the flow a reagent for reducing nitrogen oxides.

In a boiler of this type, with a duct connecting a home combustor a cyclone separation, the particles are separated in the cyclone separation and are recycled in the foyer of combustion. The gases are vented through a chimney after crossing of conventional heat exchangers located downstream of cyclone separation. The reduction of nitrogen oxides into nitrogen is inert molecular corrective action which can cut the discharge of nitrogen oxide gases discharged through the chimney.

Broadly speaking, is injected into the flow of particles and gas ammonia to reduce nitrogen oxides according to a reaction known as selective non-catalytic reduction. It is recognized today that three key parameters, temperature, residence time, and the mixture of ammonia with reactive nitrogen oxides, influence the reaction of reduction in the installation.

The European Patent Application EP 0 690 266, issued on 3 January 1996, describes a boiler in which the injection of ammonia is carried out through an opening formed in the wall of the upper conduit, this opening is willing to shorter distance from home that combustion of cyclone separation. This injection method is relatively simple to achieve. However, the injection to the duct wall does not complete mixing of the reagent ammonia and nitrogen oxides. Indeed, the flow of particles and gases, although turbulent, is dominated by a speed parallel to the longitudinal direction of the duct which limited the penetration of ammonia reagent to a layer in contact with the wall of the duct.

The purpose of the invention is to improve the mixing of the reagent with oxides of nitrogen content in the gases to promote their reduction.

To this end, the invention relates to a boiler circulating fluidized bed with a burning fireplace and a cyclone separation connected by a tube that extends along a longitudinal direction and which channels a stream of particles and gas containing oxides of nitrogen, and a means to inject into the flow a reagent for reducing nitrogen oxides, wherein it comprises at least one first tubular cane ready in recess of the upper home combustion extends above the leads so as to inject the reagent following the longitudinal direction of the duct and a co-current flow.

With this arrangement, the reagent is injected into the heart and flow in a region of dense little stream of particles that will strengthen the mix with nitrogen oxides and increase the yield reduction.

Other features and benefits of the invention will appear from reading the description of two embodiments illustrated by drawings.

Figure 1 shows very briefly to face a boiler circulating fluidized bed.

Figure 2 shows very schematically a boiler according to Figure 1, with

at least one injection cane ready at the top of a burning home or a first conduit of communication between home and burning a cyclone separation .

Figure 3 shows very schematically a boiler according to Figure 1, with at least one injection cane ready in a second leads formed by the upper part of an interchange outside dense fluidized bed.

Figure 4 is a cross-section of a cane injection.

A boiler circulating fluidized bed, shown schematically in Figure 1, includes a fireplace combustion 1, which extends vertically and whose lower part is powered by a fuel 3, for example crushed coal, and a flow Air 7 headed up the home. The combustion occurs in a large mass of fine particles of ash 5 is strongly agitated and maintained in suspension by the Airflow 7 to form a fluidized bed with a particle density decreases rapidly as the height of home. combustion occurs at a typical temperature of 850 degrees Celsius (° C) and generates oxides of nitrogen NOx.

The flow of air of fine particulates and nitrogen oxides is channeled in the upper part of the home by a first passage 9 which extends along a longitudinal direction L1 substantially horizontal and leading in the upper part of a 11A 11 cyclone separation vertically. In a circular flow of air flow in the cyclone, the fine ash particles are separated from gas and are recycled to the home of combustion 1 through a siphon fluid 13. 14 smoke outside the cyclone separation 11 and pass through conventional heat exchangers before being evacuated by a fireplace.

To help control the temperature of homes available in conjunction with the fluidized siphon 13, an intersection outside dense fluidized bed 15, which is supplied with air 16 and charged particles in the lower part 11B of the cyclone separation 11. A 17 second lead forming a upper intersection outside 15 extends along a longitudinal direction L2 substantially horizontal and channel the flow of particles and gases from cyclone separation 11 to the home of combustion 1 through a system to recycle 19 fluidized particles.

Preferably, to reduce nitrogen oxides in the gas and smoke, it injects a reagent, such as ammonia in the gaseous state, through at least a tubular cane ready so to release the reagent following the longitudinal direction of the duct and a co-current flow of charged gas particles.

In a first embodiment of the invention, Figure 2, each cane tubular 21 is ready in a top 1A household combustion 1 where the flow of particles and gas is channeled through the first passage 9 to be transported to the cyclone separation 11. Preferably in the first embodiment, each mounted on tubular cane in recess 1C of the top 1A household combustion 1 which extends above the top 9A of the first leads 9. Indentation 1C This creates a layer of impact 1B particles transported by circulating flow and reduces the density of

particles in the injection of reagent.

It is also, in a variant of the first embodiment of the invention, visible in Figure 2, for each cane tubular 21 in a top 9A of the first 9 which leads to channel the flow out of the household 1 to entry cyclone separation 11. Preferably in this variant, each cane tubular 21 is ready to close the home combustion 1 for extending the time to stay until the flow of air into the cyclone separation 11 and thus to enhance the mixing of the reagent injected with nitrogen oxides in the stream.

As a benefit, there are several tubular rods 21 in several points of a width direction of the home combustion 1 or leads 9 which is perpendicular to the longitudinal direction L1 to strengthen the mix with nitrogen oxides.

In a second embodiment of the invention, Figure 3, each cane tubular 21 is ready in a 17 second lead formed by a top 17A of intersection outside 15, where carbon is partly in élutrié particles from the cyclone separation 11. The combustion of carbon élutrié done in a high excess air above the fluidized bed dense and produces nitrogen oxides are reduced by the injection of reagent. Preferably in the second embodiment, each cane tubular 21 is ready compared to the current flow downstream from the entrance area 17B in the second led 17 of particles from the cyclone separation 11 to extend the residence time reagent, given that in the entrance area 17B, elutriation carbon is important.

Each tube 21 includes cane, figure 4, at least one injection nozzle 23. In each of the two embodiments described above, each cane down tubular 21 in the burning home, or in the first 9 or second leads 17, substantially perpendicular to the longitudinal direction or L1 and L2 directing the nozzle injection 23 in the flow direction of the flow of particles and gases to inject the reagent following the longitudinal direction of the duct and a co-current flow.

The setting of each cane injection 21 in the upper part of the household 1 or 9 or first lead of the second 17 is achieved through a flange preferably 25, which allows a shift in translation of each rod perpendicular to the longitudinal direction duct to settle down in the home or in the lead according to a lesser density of particles in the flow and thus enhance mixing with reactive nitrogen oxides.

It is also expected to treat each cane tube to improve its surface properties held to corrosion. Given the stream temperature and nature of the abrasive particles and gases, treating each applicant cane eg plasma, a coating of tungsten carbide and chromium carbide. To improve the mechanical canes, it also provides for a cooling water circulation 27. The reagent is injected through a 29 which leads from the nozzle injection 23. As reagent, is used ammonia gas, or droplets of ammonia solution, or a precursor liquid ammonia as urea solution, pulsed through the air.

Anspruch [en]

1. A boiler circulating fluidized bed, with with an outbreak of combustion (1) and a cyclone separation (11) connected by a conduit (9) extends along a longitudinal direction (L1) and which channels a stream of particles and gases containing nitrogen oxides (NOx), and a means to inject into the flow a reagent for reducing nitrogen oxides, wherein it comprises at least one first tubular cane (21) ready in recess (1C) of the upper burning fireplace that stretches above the leads so as to inject the reagent following the longitudinal direction (L1, L2) of lead (9.17) and a co - current flows.
2. A boiler according to claim 1, which means each include at least one second tubular cane (21) prepared in the upper part (9A) of the duct (9) near the fireplace combustion (1) to inject a reagent co-current flow in conduit (9).
3. A boiler according to claim 1, with an interchange outside dense fluidized bed (15) connecting the cyclone separation (11) at home combustion (1) and whose top forms a conduit (17) for the flow of particles and gas that extends along a longitudinal direction (L2), in which the average includes at least one third tubular cane (21) prepared in the upper part (17A) of the heat exchanger to inject the reagent in the flow.
4. A boiler according to claim 1 to 3, in which each rod tube (21) includes at least one injection nozzle (23) reagent.
5. A boiler according to claim 1 to 4, in which each rod tube (21) is moving in a direction perpendicular to substantially the longitudinal direction (L1, L2) of lead (9.17).
6. A boiler according to claim 1 to 5, in which each rod tube (21) includes a cooling (27) by water circulation.
7. A boiler according to claim 1 to 6, in which each rod tube (21) includes a plasma coating of tungsten carbide and chromium carbide to resist the abrasion of the stream.
8. A boiler according to any claim, in which the reagent is of ammonia gas, or droplets of ammonia solution, or a precursor liquid ammonia as urea solution, pulsed by the air.